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EDITORIAL.

IF we are entitled to judge by the number and the vehemence of contributions to periodicals we may say with assurance that interest in the question of providing "painless labour" shows no signs of decreasing either among medical practitioners or with the lay public. It is almost unusual to take up a daily paper which has no reference to the subject, and medical periodicals are equally fertile in contributions to the vexed question of how best to meet the demand. Our readers will be interested in the latest important practical suggestion which they can study in Dr. Minnitt's paper. We have no doubt that practice is on the right lines when it is designed to rely for analgesia on the least toxic of all the general anæsthetics at the practitioner's, or the midwife's, disposal. The fly in the ointment, it appears to us, is likely to make itself apparent when the question of transport arises. It is, after all, the question of providing ease for that vast proportion of mothers who are confined in their own homes at the hands of a midwife, which is all important. How are the necessary cylinders to reach these in sufficiency and in time?

POST-OPERATIVE VOMITING

By G. F. Rawdon Smith, M.D.,

Honorary Anæsthetist, Liverpool Royal Infirmary, etc.

(A paper read before the Liverpool Society of Anæsthetists).

THERE are not many subjects in medicine more fruitful than anæsthesia for stimulating discussion. Perhaps this is because in no branch of our science is practice more varied, and it is an interesting fact that with this variety of method the results obtained by competent anæsthetists are very much the same!

But put yourself into the position of the patient and you will find that the phenomenon of anæsthesia most feared by those who have had any experience is the vomiting that occurs post-operatively. Men in busy practice, who have not the good fortune to be physiologists like the late S. R. Wilson, find out how difficult it is to do research work on really scientific lines; so if this paper is somewhat empiric and unscientific, it must be put down to the fact that the present position of anæsthesia and anæsthetists does not allow many men to practice this branch alone, much less to give time to laboratory research.

Post-operative complications, besides the one already mentioned, include ileus, bronchial and pulmonary troubles, shock, and that catastrophe dreaded by all surgeons, pulmonary embolism. The scope of this paper does not include these, and it is proposed to confine it to the complication referred to in the title.

In 1922 I published some observations made since the Armistice, in which out of 441 cases 20.1 per cent were followed by vomiting to a greater or less extent (7.2 per cent for more than ten hours); of these the major or abdominal operations showed 27.6 per cent and the minor, or vaginal ones, 12.7 per cent. Both before and since that time a great deal of work has been done on the chemistry of

both the urine and blood. As long ago as 1906 Telford and Falconer noted the condition, then known as acidosis, after operation, and Whipple and Sterry traced this condition to the hepatic cells.

In 1914, after working under the inspiration of the late O. T. Williams, I presented a thesis for the Liverpool M.D. upon the acid intoxication problem; this work was part of an extensive biochemical research tragically interrupted by his early death, and showed, among other things, that anæsthetics of all kinds cause a rise in the ammonia coefficient, such rise being specially marked in closed methods and with children; confirmation was also given to Hunter's work, done in 1908 at Charing Cross, wherein it was pointed out that an important factor in both the prevention and treatment of acidosis was the exhibition of glucose.

It was not, however, until 1921 that Ross and Davis presented evidence that the hypo-glycæmia noted after operations was due to a disturbance of the pancreatic function. This was further confirmed by Best and his co-workers at Toronto. Pemberton and Cunningham, writing in the *Lancet* in September 1928, described the use of insulin in operations on the diabetic patient, and Thalhimer and Perry of Milwaukee, and Fisher and Snell of Wisconsin both published the results of treatment of post-anæsthetic toxæmia with insulin plus glucose. Meanwhile, following on the work of Swan, Atkinson and Ets, and of F. C. Mann, done between 1911 and 1924, R. J. Minnitt presented a thesis in 1925, the importance of which has not been sufficiently recognized. In this he showed, firstly, that toxæmic symptoms developing after anæsthesia are associated with high blood-sugar and that insulin administration reduced the blood-sugar and alleviated such symptoms; secondly, that the exhibition of insulin at the conclusion of the operation prevented post-anæsthetic toxæmia; thirdly, that the administration of insulin at the commencement and conclusion of other anæsthesia eliminated post-anæsthetic toxic symptoms and acetonuria. It would be interesting to know how many anæsthetists are using as a routine the therapeutic, much less the prophylactic, conclusions come to in this thesis.

Admittedly there are many factors in post-operative

vomiting; there is the nervous type of patient, who suffers from sea sickness, train sickness, etc., and who tends to vomit whatever treatment is carried out. There is the badly-given anæsthetic factor, upon which some of our surgical colleagues can wax eloquent; there is the vomiting caused by over-preparation perhaps more than by under-preparation, for all of us must have noticed that after emergency operations patients are not as sick as those who are operated upon in a more deliberate manner. Lastly, it can very easily be shown that operations involving the peritoneum are more likely to be followed by this unpleasant complication than minor ones. Since 1919 figures have been kept at the Liverpool Hospital for Women, and may here most sincere tribute be paid, not only to the late Drs. John Gemmell and Leith Murray, but also to the three sisters who have reigned in these surgeons' wards, as without their co-operation and careful observation this note could never have been written.

In considering post-operative vomiting the factors may be divided into unavoidable and avoidable. The patient's idiosyncracy, the surgeon's touch, and the type of operation come in the first class and are more or less out of the control of the anæsthetist, but even here much can be done by tact in handling one's surgical confrère. However, the avoidable possible factors such as the pre-operative treatment as regards starvation and purgation, the preliminary medication, both hypodermic and oral, the actual anæsthetic used and the post-operative treatment are more under our control, and they might be even more so by consultation with the surgeon.

Anæsthetists who have used nitrous oxide and oxygen or ethylene and oxygen know that freedom from vomiting is commoner than where chloroform or ether is the anæsthetist's choice. Up to the present, however, the surgeon's bias, at any rate, in abdominal work, has been rather towards ether on account of the greater relaxation obtained. Only a short time ago a well-known Liverpool surgeon was comparing the ease of operating under gas and oxygen given by the latest McKesson machine with that obtained with the older etherization methods, much to the disadvantage of the former.

For this paper, the degrees of vomiting have been somewhat arbitrarily divided into:

(1) No vomiting, or only a little mucus before consciousness is regained; (2) Vomiting lasting for less than twelve hours; (3) Vomiting lasting for more than twelve hours.

The purity of the ether was considered as a possible factor productive of vomiting and observations were on both major and minor cases, using in the first series Macfarlan's ether made from methylated spirit, and in the second ether purificatus manufactured by the British Drug Houses.

Influence of Different Brands of Ether.

	Major cases				Minor cases			
	No. of cases	I	II	III	No. of cases	I	II	III
Ether meth. (sp. g. .720	133	47.4	2.63	26.3	111	86.4	10.8	2.7
Ether purif. (B.D.H.)	100	44.0	30.0	26.0	92	68.4	21.7	9.7

Observations have shown that the claims of the latter firm cannot be substantiated in either major or minor operations, the minor cases particularly showing worse results with the purer ether!

Influence of Ethyl Chloride.

	Major cases				Minor cases			
	No. of cases	I	II	III	No. of cases	I	II	III
Control	63	42.4	28.7	28.7	60	66.6	20.0	13.3
With ethyl chloride	48	43.7	29.1	27.08	55	72.7	21.8	5.4

A statement repeated in text-book after text-book is that the use of ethyl chloride is liable to be followed by vomiting; this is shown by our figures at Shaw Street to be untrue. In point of fact, minor cases in which ethyl chloride was used in sequence with ether show less morbidity as regards vomiting than a similar number of cases anæsthetized without ethyl chloride. In abdominal operations, however, the use of this drug seems to have no influence.

During the whole of the series described in this paper, the pre-operative treatment as regards purgatives and diet has been constant, but various forms of premedication have been tried. Chloretone, so vaunted for sea-sickness, does not

Influence of Chloretone and Bonnite.

	Major cases				Minor cases			
	No. of cases	I	II	III	No. of cases	I	II	III
Control	133	47.4	26.3	26.3	162	86.4	10.4	3.08
With chloretone ...	83	36.1	33.7	30.1	111	86.4	10.8	2.7
With bonnite	50	40.0	30.0	30.0	No minor cases observed			

minimize the vomiting after minor operations, and in major operations actually increases it. An important incidental effect of this drug, however, is that the nervous patient comes to the table in a more equable frame of mind than without it. Accordingly I now reserve the use of chloretone for patients of the neurotic type. One fine day a gentleman came along pressing the claims of Bonnite—a finely divided form of carbon—but his claims, when subjected to the test of figures, did not prove to be true, and moreover the patients strongly objected to the black colour of the vomit!

Influence of Pre-medication.

	Major cases				Minor cases			
	No. of cases	I	II	III	No. of cases	I	II	III
Morphine, gr. ⅙, & atropine, gr. 1/100	83	36.1	33.7	30.1	111	86.4	10.8	2.7
Omnopon, gr. ⅓, & atropine, gr. 1/100	52	50.0	20.0	29.8	66	71.2	18.1	10.6
Morphine, gr. ⅙, & atropine, gr. 1/150 (in 2 c.c. 50% mag. sulph. soln.)	39	46.1	17.9	35.8	61	78.6	11.4	9.6
Atropine, gr. 1/100, ¾ hr. before morphine, gr. ⅙, at end of operation	41	29.2	26.8	43.9	15	60.0	20.0	20.0

INFLUENCE OF HYPODERMIC PREMEDICATION.

Omnopon in the dose of gr. 1/3 showed rather better figures than morphine gr. 1/6 in major operations, but considerably worse in minor—a difference difficult to explain.

The synergistic method advocated by Gwathmey was next tried, morphine gr. 1/6 and atropine gr. 1/150, dissolved in 2 c.c. of 50 per cent magnesium sulphate solution, were injected hypodermically an hour beforehand, but the percentage of cases of the third degree of vomiting was so much higher than when omnopon or morphine was used in the ordinary way that the method was given up after a strong representation on the subject from the ward sister!

The next stage was a trial of atropine, gr. 1/100, alone before operation, followed by morphine, gr. 1/6, on returning from the theatre. Again the third degree of vomiting rose so high that it was not considered justifiable to continue. Parenthetically it may be say that some anæsthetists deprecate the use of morphine; their opinion might change if they consulted the nursing staff.

Influence of "De-etherisation" with Oxygen 10% Carbon Dioxide.

		Major cases only		
	No. of cases	I	II	III
Control	41	52.3	27.6	20.0
Oxygen + 10% CO_2	50	46.0	28.0	26.0

Same preparation, viz.: morphine, gr. ⅙, and atropine, gr. 1/100, one hour before operation.

Some years ago there was a good deal written about the advisability of de-etherization of the patient by the administration of oxygen plus 10 per cent carbon dioxide; this technique was tried in 50 cases of major operations, but the results were not good as regards vomiting, and thoroughly unpopular with the ward staff; for, instead of the patient remaining comfortable for some hours after leaving the theatre, she required attention almost immediately and was obviously more shocked than if she had been left alone to

eliminate the ether in the ordinary way. This observation of the effect of CO_2 is also borne out by the fact, difficult of explanation, that where CO_2 has been used for more than a few seconds in the course of an operation vomiting is likely to be more serious than when CO_2 has not been used.

Here are some figures taken from cases where oxygen was administered during part of the operation either for cyanosis or muscular rigidity. They show, as might be expected, that oxygen has a slightly beneficial result, the percentage of serious vomiting diminishing.

Influence of Oxygen.

		Major cases only		
	No. of cases	I	II	III
Control	50	44.0	30.0	26.0
Oxygen given for cyanosis or rigidity ...	50	50.0	30.0	20.0

Lastly, there is a series of 153 cases, 70 of them being major operations; in this series the routine was 2 oz. of glucose by mouth three hours, and 5 units of insulin hypodermically half an hour before operation. On return to the ward the dose of insulin was repeated and four or five hours later 4 ozs. of glucose injected per rectum, except in the cases of vaginal operations when 2 ozs. was given by mouth. The result was to lessen the serious type of vomiting from 26 per cent to 12.5 per cent in major and from 9.7 per cent to 1.2 per cent in minor operations.

Influence of Insulin.

	Major cases				Minor cases			
	No. of cases	I	II	III	No. of cases	I	II	III
Control	100	44.0	30.0	26.0	92	68.4	21.7	9.7
Insulin 5 units before & after operation	70	74.2	12.8	12.8	83	92.7	6.0	1.2

These results are striking and leave no doubt that in cases where ether is demanded by the surgeon or indicated by the patient's condition we have a way of controlling post-operative sickness except in a very small percentage of cases, for which the cause must be looked for elsewhere than in pancreatic dysfunction.

Conclusions: (1) Provided it is a good brand of ether, the particular make has little or no effect on post-anæsthetic vomiting. It is unjustifiable, however, on theoretical grounds, to use other than some form of ether purif. (2) Morphine and atropine given in the usual way cannot be improved upon. (3) In insulin and glucose we have a real advance in both prevention and treatment of post-anæsthetic toxæmia, and one that deserves wider recognition than it has at present.

THE PRESENT POSITION OF AVERTIN ANÆSTHESIA

By KEMPSON MADDOX, M.D., M.R.C.P.

AVERTIN has now been administered to something over a million and a half of the world's population, to individuals ranging from a few months to 96 years of age, and for practically every reason for which a narcotic is required. After five years' use it is desirable to take stock of the situation, to ask whether its promise has been justified and whether it is destined for abandonment or continuance in a limited sphere.

In the first place it cannot be denied that it was throuogh avertin that the humane concept of basal anæsthesia became introduced. Before 1928 premedication was known and practised extensively, but unfortunately did not always mean prenarcosis. Avertin, by guaranteeing sleep, great reduction in ether consumption and a retrograde amnesia in almost every case was welcomed as the fulfilment of a long-felt want. As the forerunner of a host of injectable or oral anæsthetic agents which are less recoverable than the inhalation anæsthetics, it had many prejudices to overcome and many doubts to subdue. Our present survey may best be furthered by the resurrection of some of these objections and the examination of them in the light of subsequent experience.

(1) "Avertin is dangerous and increases surgical risk." Every general anæsthesia is dangerous to some degree, it will be generally admitted. There are only three methods of assessing the "danger" of any drug, these are (*a*) Experimental pharmacology, including the administration of the drug to the laboratory animal in increasing doses until death constantly ensues. The lethal dose is thus determined for each particular animal, and the margin of safety can be expressed as a quotient when compared with the average minimum narcotic dose, providing this is sufficient for sur-

gical procedures. The words "for each particular animal" reveal the weakness in this method, by which only a very approximate guide can be obtained for the use of the drug in man. Lendle, however, was able to show that avertin was highly satisfactory in this respect.

(*b*) Experience of able senior anæsthetists who, in virtue of their long acquaintance with traditional anæsthesia and its hazards, are able to form a valuable opinion as to the toxicity of any new anæsthetic in regard to a particular class of patient. This estimate, in my opinion, is not given the weight it deserves. Statistics, laboratory tests, and other objective evidences are always being called for, but I would as well prefer the considered and dispassionate opinions of such anæsthetists as Shipway and Blomfield, who, after a thousand administrations of avertin, have no complaints to make whatever. It is indeed noteworthy that the highest praise of avertin anæsthesia always emanates from those who have had the most experience of the drug, and unfavourable criticism from those who had the least.

(*c*) Mortality statistics. In general statistics are universally admitted to be notoriously unreliable. In particular, one of the most uncertain classes of statistics to those who have had to examine them are those relating to death after operation.

Post-anæsthetic deaths are usually estimated at so many per 10,000 or 100,000 or recorded as a percentage. To carry this to two or more decimal points or to argue on slight differences is to display poor actuarial and professional insight, so many factors are there which have to be considered. Provided any anæsthetic has a mortality figure in the neighbourhood even of that accepted for ether given in the other method "open" it may be regarded as "safe." Avertin passes such a standard.

In 1931 Schüberth analysed 72 deaths which occurred during or after an operation in which avertin was one anæsthetic agent employed in a series of about 250,000 administrations. He could ultimately accept only 14 of these in which avertin was probably the cause, and in the majority of cases this was due to an overdosage or to combination with one or more other powerful narcotics. Professor Anschütz in his "Die

Darmnarkose mit Avertin" estimated that in 1930 one death occurred in 10,000 administrations, but that this figure should be now one in 25,000 owing to improved technique in administration.

This is mainly in a return to the standard doses of .1 gm. per Kg. with not more than 1/6 gr. morphia. I submit for your perusal a detailed list of mortality figures in Germany prepared by Anschütz. They show ten deaths in 81,510 administrations by 36 authors distributed as follows:—

Avertin Deaths certain Dose .06—.1	Avertin Death questionable Dose .06—.1	Avertin Deaths certain Higher dosage	Avertin Deaths questionable Higher dosage
2	1	4	3

A current idea in Sydney about two years ago was that avertin was not only desirable but actually indicated for bad surgical risks, yet if the patient died the drug was invariably held responsible. It would be valuable to examine closely our local deaths, but I found on inquiry in two large hospitals that either the records of anæsthetic deaths were not isolated as such or that there was insufficient evidence in the notes or investigations to allow critical judgment. Certain it is, however, that in so far as it is allowed the amount of inhalational anæsthetic to be substantially reduced avertin has a definite sphere in the surgery of those affected with chronic lung disease. A combination of avertin, local and gas-oxygen anæsthesia has been claimed to be the safest yet conceived.

(2) "The rectal route has many disadvantages, including that of inability to recover the drug."

I would contend on the other hand that the rectal route has many advantages over inhalational or intravenous routes or even the oral. Absorption from the colon is rapid and constant. It is less active than the stomach, thereby giving more time, better facilities and less risk for washing out the drug should any alarming symptoms develop early. A drug injected intravenously is wholly irrecoverable and the elimination of a volatile anæsthetic depends largely on efficient artificial respiration. While avertin is absorbed very

quickly anæsthesia can be appreciably shortened by washing out after 20 to 25 minutes.

Rectal anæsthesia has a special field in restless or emetic states or for anæsthesia "by stealth" in goitre surgery. There are strikingly few instances of diarrhœa or colonic irritation following avertin. A recommendation this year by H. K. Ashworth that the Universal Indicator (B.D.H.) should replace 1 in 1,000 Congo Red as an indicator of free hydrobromic acid is consequently scarcely necessary apart from the fact that the indicator is really too sensitive for this purpose.

(3) "Avertin causes too much respiratory depression and fall of blood-pressure which predispose to post-operative, culmonary sequelæ."

These statements are partly true. Respiratory depression is an inseparable feature of avertin anæsthesia as it is of natural sleep. Cyanosis, however, cannot be regarded so lightly provided, of course, that the airway is perfectly clear. Mild cyanosis should not be regarded with alarm, but, personally, if I see the slightest evidence of cyanosis with a clear airway I now give "Coramine" and some CO_2. It is better to give these restoratives early than late, and more frequently than may actually be necessary. I have done this on three occasions only. "Coramine" should be provided with every avertin kit, and a bottle of the aqueous solution. If required 6 c.c. are slowly administered intravenously followed by 5 c.c. intramuscularly.

The equanimity with which workers with avertin have come to regard a 30 to 40 mm. drop in systolic blood-pressure has received experimental confirmation from the United States of America, where it was shown that the venous oxygen remains within normal limits as opposed to true surgical shock. Ephedrine has come to be relied upon to restore this level if required and also shortens the anæsthesia.

One extraordinary property of avertin recently emphasized by Shipway is that the cough reflex is regained almost as soon as inhalational anæsthesia ceases. Instead of being inadvisable, as one once thought in operations on the upper respiratory passages, avertin is thus perfectly safe and even desirable.

(4) "Avertin has a toxic action on the liver."

Reports are abundant of the successful use of avertin in the presence of jaundice, cholecystitis and hepatitis. McKim and Bourne, of Montreal, have recorded an instance where avertin was administered 22 times in eight weeks to a man of 37 who required multiple dressings. Rabinowitch determined minor deviations in dye, pigment and sugar tolerance tests which on investigation proved to be related to exacerbations of the concurrent infection and not to the number of anæsthetics. Anæsthetists need to be continually reminded that infection is a most potent cause of fatty degeneration of the liver.

(5) "Avertin frequently causes excitement or troublesome restlessness during induction or recovery."

This criticism applies to almost any narcotic and is largely a matter of personal idiosyncracy which is difficult to foretell. It is most commonly seen when small doses are given to nervous patients, e.g. during childbirth, and can be prevented by 1/6 gr. morphia or the immediate use of open ether. It is less commonly seen in avertin than in barbiturate anæsthesia and the general advantage of avertin over this group is its greater constancy of effect.

(6) "Avertin is too troublesome and time-consuming in its preparation."

This, one concludes regretfully, is the real reason for the lessened use of avertin in our busy cities, but is an argument rather characteristic of our own country. There are two methods of overcoming this difficulty: one is to prepare the solution at home and put it in a thermos flask, the other and more debatable method is to allow the senior nurse or matron of the nursing home to give the solution half an hour before the arrival of the anæsthetist and surgeon, the dose having been measured out at a preliminary visit to examine and weigh the patient. This is parallel to the administration of morphia, hyoscine, etc., by responsible nurses but raises a minor legal query. The question of a free airway, possible cyanosis, etc., should be carefully explained, but is essentially the same as that required after the anæsthetist's departure. The favour or otherwise with which avertin is re-

garded in a nursing home is an interesting commentary on its efficiency.

In conclusion avertin has earned for itself a permanent place in the treatment of convulsive states, including tetanus, where it has been a life-saving measure. It seems to have more constant results and evoke less idiosyncracies than the barbiturates for whom it has paved an easier way. Its greatest drawbacks in this country are time and expense; at present the latter renders paraldehyde its most serious rival. With regard to its future place in obstetrics I am not qualified to speak. Sales of the drug in Australia, I am informed, indicate that it is still in considerable demand, especially in country areas. No drug in the Pharmacopeia is "ideal" for the purpose for which it is used, and to this avertin is no exception, but I venture to say that the use of avertin will only cease if and when basal narcosis itself is discarded.

Our experience agrees with that of Professor Anschütz, who in the final paragraph of his book says as follows: "We believe in avertin, because so far we have never had with that drug the distressing experience of an anæsthetic death, nor have we seen a case in which the fatal issue of a correctly-performed anæsthesia was utterly at variance with the pathological condition of the patient and with the operative procedure."

As an interesting addendum to Dr. Maddox's article, we are glad to print the following contribution:

AVERTIN IN OBSTETRICS

By Cecil Coghlan, Sydney.

I FIRST used avertin in obstetrics in 1929 and since have delivered 133 women under its beneficial influence. So satisfied am I, that I now do not conduct a confinement without it or one of the other basal narcotics.

At first I used avertin alone, but for the last 18 months have been using it in conjunction with sodium amytal or

nembutal. During the last four and a half years I can divide my obstetric work into four series: (1) Using avertin alone; (2) using sodium amytal alone; (3) using nembutal alone; (4) using sodium amyal or nembutal in conjunction with avertin.

Series (1) comprised 82 cases. In this series I used from one to five doses of avertin on the individual patients, but discontinued this technique owing to the time necessary to devote to each case—the doctor having to be present to estimate the dose necessary and the time to repeat it. I gave full details of this method in the *Medical Journal of Australia*, June 20h, 1931, page 737.

Seeking a simpler method of providing amnesia in childbirth, I then tried sodium amytal in a series of 20 cases and nembutal in a series of 12 cases. These drugs I found only partially successful; whilst in 33 per cent of cases I got perfect results, I found that the majority of cases had a fair amount of restlessness and many had greater or lesser periods of memory, which in a state of partial amnesia seemed to project themselves on the patient so that they thought that the "twilight sleep" had been unsuccessful. These faults seem particularly noticeable during the second stage. Unlike with avertin, I was unable to type the patients as to their tolerance of these drugs.

I then started the case as soon as labour commenced on nembutal, and as the second stage approached gave an injection of avertin. This technique I have found very successful, and under it I have now conducted 51 confinements all with complete amnesia; so successful in fact that a number of women refused at first to believe that they had been through labour.

My technique is as follows: As soon as labour has definitely commenced I give 6 grains (4 capsules) of nembutal. Under this dose the patient sleeps for several hours. When she shows signs of waking I am notified by the nurse in charge, visit her, and after examining the progress of labour and the patient's condition, decide whether to repeat the nembutal, 3 grains (2 capsules) or give avertin 0.08 c.c. per kilogram of body weight at term. After the previous administration of nembutal this dose of avertin will carry

the patient through four to six hours, whilst without it, it would only have the desired effect for from two to three hours. In very few cases is it necessary to repeat the avertin. This technique I have found very successful. It does not throw too much strain on the busy practitioner—to the mother it is of great benefit, and I have never had any ill-effects on the child.

SELF-ADMINISTERED ANALGESIA FOR THE MIDWIFERY OF GENERAL PRACTICE

By R. J. Minnitt, M.D.,

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(Abstract of a paper read before the Royal Society of Medicine.)

IT has always seemed to me that until recently the progress attained in the relief of pain during childbirth came to a standstill with the work of Simpson. In trying to solve the problem certain main principles have to be considered, which can be briefly stated as follows:

(1) The procedure must be simple and inexpensive.
(2) There must be no danger to mother or child.
(3) Labour must not be prolonged.
(4) There must be relief from the pains of labour.

There will be described in this paper a method of analgesia which I am satisfied fulfils these conditions.

I would mention here that when the word "analgesia" is used it implies insensibility to pain without loss of consciousness. Gas and oxygen anæsthesia has been given for a number of years in obstetric cases with a large measure of success. This mode of relief, however, could never be made available for all patients.

Although I had been considering the question of gas and air analgesia in midwifery, I am indebted to Dr. Howard Jones for the suggestion that this could be used with great advantage in maternity work, and this stimulated me to make the experiment.

After consultation with Mr. A. Charles King, a gas and air machine was devised and no trouble has been spared by him to make the apparatus thoroughly efficient and reliable. Figures 1 and 2 show the simplicity of the machine, and details are given of the inexpensive consumption of gas.

FIG. 1

FIG. 2

The apparatus—an adaptation of the McKesson oxygen therapy apparatus—consists of a reduced pressure valve, which allows nitrous oxide to be brought down in pressure from the cylinder, so that it can be delivered to a small rubber bag enclosed in a metal drum. An automatic valve prevents the flow of gas when the bag is full. As soon as it deflates through inhalation more gas is allowed to enter.

The outlet of the machine is divided into two channels, one for the passage of gas and the other for the passage of air, the latter opened at the bottom by a series of small holes round the collar, so that there is added a proportion of air, making the mixture as constant as possible. Above these channels is a check valve which intermits the flow, and is only lifted when fresh gas and air is inhaled, thereby preventing an escape while the patient exhales. The whole action is controlled by inspiration.

On the face-mask is fitted a spring finger release, which is pressed down during inhalation, but supplies full air (therefore throwing the machine out of action) should either the analgesia become deep enough to weaken the force used, or at the will of the patient. The expiratory valve is inserted in the facepiece, and is not adjustable, a spring allowing it to rise with expiration.

I desire that it should be clearly understood that the apparatus was never intended for the purposes of anæsthesia, so that this precludes its use in the ordinary way for any obstetric operation such as version, the application of forceps, or extensive repair of the perineum.

The machine has been fitted up in two ways, one in a carrying case—as a portable model for domiciliary work (weight about 15 lb. without cylinders), and the other on an aluminium stand for hospital use. I understand that the price of each will be the same.

The amount of gas consumed is on an average 35 gallons per hour, which has been estimated by calculations carefully made in a number of cases. The analysis of the mixture inhaled is approximately 35 per cent nitrous oxide in air.

Technique of administration. The analgesia is self-administered. The only important point is that the mask must be air-tight, and therefore kept in close apposition to

the face of the patient. Scientific work has been conducted to show that by use of the apparatus there is no danger to mother or child.

(*a*) *The Mother.* Electro-cardiograph tracings of six patients were taken on three separate occasions—the first of these in each case during labour a few minutes before gas/air analgesia commenced. The second electro-cardiograph was taken after the administration of analgesia for 4 hours, 5 hours, and 1 hour 25 minutes. Analgesia was then continued until delivery in 1½ hours, 2 hours 35 minutes, and 35 minutes respectively. In the last of these three cases the patient was delivered by forceps on account of rigid perineum, but had to be given an open ether anæsthetic for the repair of the lacerations.

In the other three cases the second electro-cardiograph was taken following delivery after gas/air analgesia for 2 hours 10 minutes, 2¼ hours, ando 3½ hours. The third electro-cardiograph was taken a few days after delivery in each of the six cases.

The Cardiologist's Report states that no change of significance is produced by the analgesia.

(*b*) *Mother and Child.* A table has been drawn up showing estimations of the mothers' pulse and fœtal heart rates at approximately equal intervals during gas/air analgesia, which offers good evidence that this has no apparent effect on the rates.

(*c*) *The Child.* Although no ill-effect was observed upon the infant in any of the cases where gas/air analgesia was administered to the mother, sometimes for long periods, it seemed well to carry out a scientific investigation to corroborate this fact.

As a control blood was taken from a maternal vein and the umbilical cord in a number of patients immediately after delivery, when there had been no administration of analgesia, and a table compiled of the results. This shows that when there was no cyanosis or asphyxia of the child on delivery, the oxygen content of the blood from the umbilical cord was slightly higher than that of the mother. In the cases where the child was born showing these symptoms on account of long delivery or the cord encircling the neck, the

oxygen content of the blood from the umbilical cord was reduced.

In comparing this table with that of patients having gas/air analgesia an interesting point is observed. Cyanosis of the mother was rather encouraged, and indeed in one case actually produced, in order that delivery could be accomplished by forceps. As one would expect, the oxygen content of the mothers' blood was reduced (in this latter case to a very low level), but that of the umbilical cord does not show any significant alteration. With the exception of the cases where there was some cyanosis of the child, due to obstetric reasons, the results of estimation of the oxygen content of the blood were much higher than those of the mother.

With regard to the effect of the method on the duration of labour, it appears to me that an average length of the second stage in primigravidæ of under two hours, and in multigravidæ of under one hour, does not warrant criticism on the score of prolongation of labour.

With regard to what is the most important part of the investigation from the patients' point of view, I leave my audience to judge from the printed reports the value of the relief from the pains of labour attained by this analgesia.

My own impressions are as follows: After the administration has commenced an obvious change occurs in the labour ward. In a place previously filled with groans comparative peace and quiet reign. Vomiting is rare, and fluids can be freely enjoyed. The patient is less tired and worn out by the efforts of labour, through being analgesic, notwithstanding the natural forces appear to be increased. Amnesia is also produced in most cases, as the following day the mother often states that she remembers nothing about the birth.

The machine was first tried out in two institutions—(1) at the Liverpool Maternity Hospital, by Dr. Hilda Garry, a grant having been obtained for this purpose through the kindness of the National Birthday Trust Fund, and (2) at the Wellhouse Hospital, Hertfordshire, by Dr. John Elam, under the supervision of H. Roland Segar, Esq., Medical Superintendent. Both of these investigations were conducted under my direction and control. Warm appreciation

has been expressed by the Medical Officers in charge of the patients at both these institutions

The conclusions that can be drawn from the evidence presented I do not think can be better expressed than by reiterating the words of the report of the Medical Board of the Liverpool Maternity Hospital: "The apparatus is portable and admirably adapted for use in domiciliary work. The method is simple and safe. It does relieve pain without interfering with the progress of labour, and without ill-effect on the mother or child."

GENERAL INTRAVENOUS ANÆSTHESIA WITH EVIPAN-SODIUM

By Dr. Pasquale Serocca, Naples.

(Translated by George Edwards, M.R.C.S., L.R.C.P.)

Physiological and Historical.

FROM the point of view of general physiology, anæsthesia can be defined as a diminution in the power of reaction of the living body; a diminution produced by chemical reagents, increasing proportionately with their concentration and having the property of reversibility.

Indeed in 1902 Leduc announced the results of experiments made on dogs with frequently interrupted galvanic currents. The animals traversed by the current in the caudo-cranial direction fell suddenly asleep, apparently without pain-sensibility, but with muscular contractions strong enough to produce asphyxia. Apart, however, from this experiment the practical application of which we shall not discuss, the earliest used anæsthesia agents were those given by inhalation, and of these the most frequently employed were ether, chloroform, C.E. mixtures, ethyl-chloride, the gaseous anæsthetics such as nitrous oxide, ethylene, narcilene) together with other substances of varying success. Anæsthesia by the subcutaneous route has, on the other hand a much shorter history, and owes its origin to an invention made by Wood in 1853—that of injection through a hollow needle. It was an outcome of this discovery that about the year 1900 attempts were made to produce anæsthesia by subcutaneous administration of soporific substances, culminating in the introduction of drugs acting synergistically, such as morphine and scopolamine and scopolamine-ephedrine, or else acting alone, as veronal and its associated preparations, isopral, hedonal, etc.

Almost at the same time as the discovery of the narcotics, local anæsthesia was introduced. In some year about this time, however, researches were resumed for some new form of anæsthetic agent and led to intravenous ansthesia first by ether (Burchharat, 1909) and then by pernocton. In the meantime there came into use rectal injections of avertin, which was also tried by the intravenous route. Then arose the question—why should one seek a new anæsthetic method?

Bosse replied that patients with the daily troubles of these modern times, patients with debilitated nerves, patients especially with physical illnesses, who on account of their low resistance render local anæsthesia unsuitable, all of them are in the first place in great need of narcosis. To this need there is added another fact which has all its own importance. Of the modern methods of anæsthesia available to the surgeon the general method of inhalation is not always feasible either because of danger and difficulty caused by the patient's condition or because of the site of the operation. Similarly local anæsthetics sometimes cannot be used either because of the mental factor or for some other reason.

Search for New Drugs.

Thus, little by little, after experiments, not without incident, with avertin and pernocton, search was made anew among the derivatives of barbituric acid. It was working in this field that Kroft and Taub isolated N-methyl C.C. cyclo hexemyl methyl barbituric acid called 'evipan'. This new drug was found to be capable of inducing a sleep sufficiently easy and deep and free from complications, and only large doses were liable to cause death. On account of these qualities evipan seemed to meet the needs of surgery, but the chief obstacle in the way of its use was the difficulty of getting solutions suitable for injection. This difficulty was completely overcome by means of the sodium salt which has the properties of being crystallisable, colourless and easily soluble in water. The solution, however, must be freshly prepared, as it is not stable,

although decomposition does not take place in non-aqueous organic solvents, such as methyl-diglycolate. [What is this? —G.E.]

It was now that Weese engaged in an accurate study of the effects of evipan-sodium, observing them in cats into which he injected a 10 per cent watery solution.

In the course of his experiments he established the fact that after the first minute the animal became still and lowered its head, whilst its respirations, although maintaining their rhythm, were slower. When a certain maximum dose was exceeded death occurred from respiratory failure. He did not observe any peculiar phenomena during the sleep except that a light tremor and small fibrillary twitching were present during the awakening—which seems to be one of the effects of the barbiturates in general. He established clearly that rapid injection of the drug increased the intensity and rapidity of the narcosis owing to the greater flooding of the central nervous system. With 25 milligrams per kilo of body-weight there was always an intoxication of the cat often going on to complete narçosis; this effect was produced in dogs with 30 mg. per kilo. The maximum dose was fixed at 100 to 110 mg. of evipan-sodium per kg. of the cat. The results of the investigation were found to be such as to justify clinical use of the drug.

Characteristics of the Action of Evipan-Sodium.

In experiments on animals and later in those on men, it has been seen that in every case, evipan sodium has a rapid action and an equally rapid rate of recovery. In fact the maximum of anæsthesia when using the drug alone is attained at the end of the injection. Then, regarding its progress, Monod has observed that after 15 minutes the corneal reflex reappears, after 20-25 minutes the patient reacts to pricks and replies to questions, and after 55 minutes the recovery is complete.

Evipan-sodium is completely metabolised by a process of chemical disintegration taking place in the liver. Inasmuch as the detoxication is completed very quickly (a rabbit disposed of half its maximum dose in 13 minutes),

it follows that the narcotic, notwithstanding its non-volatile nature, is almost equal to ethyl choride in the rate of recovery (Monod). Further, the patient does not require preparation: on the contrary, he is fit for operation in cases of emergency, even though he has just had a meal. Nevertheless, according to Kaspar, it is always advisable, when possible, that the stomach should be empty. As regards the action of the drug on the various organic systems, it is found that evipan sodium rarely appears in the urine, and then only in minute traces. It has no detrimental effect on the blood; nor has it on the liver, notwithstanding that it is there destroyed. During the anæsthesia, the temperature falls but slightly, unless vomiting has occurred. (Monod). The blood-pressure, however, falls to a noticeable degree: some have seen a rapid fall (Monod), whilst others (Setening and Beck) have not observed it. Usually, according to Lauber, the fall in pressure is from 20 to 30 mg. of Hg. In arterio-sclerotic patients, however, he had seen a fall of 100 mg. of Hg. without any noticeable result. He has seen neither cyanosis nor pallor. The pulse usually remains normal, the rate sometimes being increased by four to five beats a minute. Similarly, respiratory movements remain regular, and there is only a slight lessening in their depth and frequency. However, by the use of a mixture of CO_2 and O_2 the respiratory function can be improved at once. Occasionally shivering has occurred, which stops as soon as the rate of injection is lessened. Jarman and Lawrence have noticed, at the injection of the first cubic centimetre, a light tremor which disappears in a few seconds.

(To be Continued.)

CASUAL COMMENTS

Cyclopropane.

We notice increasing references to cyclopropane in current writings on anæsthetics. Hitherto but little work has been done, we believe, in this country with that anæsthetic. There are obvious reasons for this. Firstly, the gas is so expensive to manufacture and consequently so expensive to use that it is not practicable to employ it after the same fashion as that in which nitrous oxide is given. It is beyond the means of most anæsthetists and of most institutions to use cyclopropane without rebreathing or even in the ordinary partial rebreathing of many "gas" machines. The amount of the gas used can, however, be so reduced by properly constructed and properly employed machines, which include a soda-lime CO_2 absorption apparatus, that the use of cyclopropane in these greatly restricted amounts has become a practicable proposition. As cyclopropane can be given and produce good anæsthesia with 80 per cent or more of oxygen, and as it seems most advantageously free from toxic effects, or from depressing circulatory action, or from after-effects we imagine it is likely to be widely employed in the near future. This can only be, however, with the carbon-dioxide-absorption method, and this method seems to have met with but scant adoption so far in this country, considering how great is its economic advantage in association with nitrous oxide administration.

Coroners' Inquests.

For many years there has been on the part of anæsthetists a feeling of discontent with the arrangements and the results of coroners' inquests on deaths associated with anæsthesia. This discontent has no grounds in personal feelings as between anæsthetist and coroner, for almost invariably when the anæsthetist has to appear in the Coroner's Court he is treated with all possible courtesy and consideration. Nevertheless he often leaves with the feeling that he has been

exposed to an ill-judged and unnecessary investigation and with the knowledge that this will gain a publicity that cannot do him any good, and will most likely do him an undeserved injury.

The anæsthetist's dissatisfaction has its cause in several different factors. Firstly, he is puzzled by the varying action of different coroners in deciding whether to hold an inquest at all. He finds that in some hospitals he is required to notify the coroner if the patient dies in the ward, after leaving the operating theatre, without recovering consciousness; in others he must do so even if consciousness has returned but death takes place within 24 hours; and in others, again, he is not required to notify at all, provided that the death does not take place actually in the operating theatre.

Then the anæsthetist is, naturally, more puzzled than pleased when he is summoned to the inquest on a fatality, the causation of which was obviously primarily surgical and with which he had little, if anything, to do. "Why," he thinks, "am I summoned and not the surgeon? If it was anybody's fault it was his, not mine, that the aneurysm burst, or that the great vessel was divided, or that fatal shock was produced by prolonged and severe tissue damage."

Most of all, perhaps, is the anæsthetist grieved by the wastefulness of present arrangements, so far as the improvement of knowledge by these inquiries is concerned. The anæsthetist, more than other men, hopes for the diminution of anæsthetic fatalities. He realizes that the knowledge to be gained by a complete scientific inquiry, clinical and pathological, into every death associated with anæsthesia would almost certainly result in increased knowledge which would help him to make his procedures still safer than they have become to-day. Yet he sees in the location and the manner of coroners' inquests a system which makes these inquiries almost useless from this point of view. The clinical and the post-mortem data are separated; often the former is conducted by one who is no expert. The records of the cases are so separated and stored that for purposes of research they are well nigh useless.

Furthermore there is the wide and often sensational publicity frequently given to the accounts of inquests on deaths after operation. The anæsthetist wonders to whom these stories are of any benefit. He knows full well to whom they are injurious. They do harm to his own reputation and they do much harm to patients themselves about to undergo operation who happen to read them. The fear and anxiety thus aroused are a formidable aid to the natural trepidation often present before undergoing an operation, and they may play even a decisive part by psychological effect in bringing about yet another anæsthetic fatality.

Few anæsthetists, we imagine, would advocate the abolition of inquiries into deaths associated with anæsthesia. They believe in the fullest and the most instructed investigation; but they believe that this could often be best carried out without the holding of an inquest, and they doubt whether full general publicity in these matters has anything to recommend it whatever.

ASSOCIATION OF ANÆSTHETISTS OF GREAT BRITAIN AND IRELAND

THE Annual General Meeting of the Association took place on Friday, May 11th, at the Rooms of the Medical Society of London, Chandos Street.

The PRESIDENT (Dr. H. W. Featherstone), in presenting the Council's report for the year, drew attention to the composition of that body. The Council consists, he pointed out, of 16 anæsthetists representing 14 British Schools of Medicine. Members of the Association belonging to a school without direct representation on the Council have the right to select a corresponding member through whom that school can be kept in touch with the Council's work. During the year the need for putting anæsthetic departments of hospitals on an equal status with other departments had led to correspondence with the Medical Boards of several hospitals, and desirable reforms had in consequence been brought about in at least two institutions. An endeavour had also been made to secure salaries for those visiting anæsthetists who give time to hospital work with whole-time surgical units. This matter was still subject to negotiations, and had not yet reached a satisfactory conclusion. The inadequate remuneration at certain "tonsil and adenoid" clinics and at a certain hospital in northern England were other matters with which the Council had been busied during the year. The Council had been consulted by the Chief Medical Officer of the Board of Education concerning the administration of chloroform at children's clinics. In reply to the advice which they had given the Council received cordial thanks from the Chief Medical Officer as well as from the Chief Medical Officer of the Ministry of Health. A sub-committee had been appointed to deal with the question of a diploma in anæsthetics. Their report was presented in full to the meeting. After much discussion the President was authorized to write to the President of the Royal College of Surgeons (England), who

had unofficially given promising assurances as to the conduct of his Council in the matter. The Sub-Committee on Coroners' Inquests also reported, and it was shown that attempts were being made to interest the Medico-Legal Society and the Coroners' Society in the question.

SECTION OF ANÆSTHETICS

(Royal Society of Medicine).

At a meeting on May 4th, Dr. H. P. Fairlie, president, in the chair, Dr. R. J. Minnitt read a paper on self-administered analgesia in midwifery, of which we publish a full account on page 146. The paper was admirably illustrated by a cinematograph, and the apparatus was demonstrated. Several speakers who had employed the apparatus gave it wholehearted commendation. These included Dame A. L. McIlroy, of the Royal Free Hospital, and Mr. L. C. Rivett, of Queen Charlotte's Hospital. Dr. Lloyd Williams presented a report on the use of the apparatus on 29 obstetrical cases. He found analgesia very satisfactory during the first and second stages of labour, and that the duration of the second stage was shortened by gas and air. In no instance did the condition of the infant at birth give rise to any anxiety.

Miss F. C. Kelly spoke of 18 cases at University College Hospital. There were three failures, two of which occurred in hysterical women who refused to co-operate. The greatest relief followed use of the analgesic for one hour or more. One patient had it for 14 hours with great satisfaction.

Dame Louise McIlroy laid stress on the fact that the most painful time of labour was at the end of the first stage before the cervix was fully taken up. She believed Dr. Minnitt's apparatus to be of great service for obviating this pain, and labour might be finished off with the assistance of chloroform capsules.

Dr. A. A. Gemmell believed that breakdown of the apparatus was the only possible emergency to be feared. He found that the resistance of the second stage of labour was abolished by the analgesia and that there was usually amnesia after delivery.

Mr. L. C. Rivett had employed the method on 25 patients at Queen Charlotte's Hospital. One half of these received perfect assistance, the other half not such complete analgesia; in all the second stage was shortened.

ABSTRACTS

Cyclopropane as an anæsthetic agent. J. A. STILES, W. B. NEFF, E. A. ROVENSTINE and R. M. WATERS. *Anæsth. and Analg.*, March–April, pp. 56 *et seq.*

Cyclopropane is the isomer of propylene (C_3H_6) which has itself been tried for anæsthesia but with unsatisfactory results. Cyclopropane is far more promising. The authors have used it on human beings over 447 times. Animal experiments had shown satisfactory anæsthesia with 10 to 20 per cent in oxygen. Toxic effects from overdose were limited to depression of respiration, general metabolic effects and circulatory damage being absent. Premedication with morphia ($\frac{1}{8}$ to $\frac{1}{4}$) and scopolamine (1/200 to 1/100) was generally employed. The carbon dioxide absorption technique was used and the cyclopropane given in a proportion of not more than 20 per cent to 80 per cent oxygen. Generally three to five minutes sufficed for procuring surgical anæsthesia. Recovery is remarkably rapid, usually four or five minutes from surgical anæsthesia to full consciousness. Relaxation is described as being as complete as that produced by ether. The gas is less explosive than ethylene and has no undesirable physical properties. Post-operative complications have compared favourably with those following other anæsthetics.

Ether explosion with Roth-Dräger apparatus. SCHMERZ, *Narkose u Anæsth.*, March 1934, p. 98.

After giving details of the explosion, which resulted in burns of the mouth and throat of the patient, who had first been given evipan, the author attributes the blame to the apparatus. This was on wheels, much moved about and not insulated. An article follows which goes with detail into the question of electrical causation of explosions with anæsthetics. The facts and arguments are mainly those which

have been made familiar by previous writings in America. At page 119 of the same number is to be found an account of experiments to discern the effect of ***anæsthesia on anaphylactic sensibility***.

Experimental study of spinal anæsthesia. K. W. THOMPSON. *Surg. Gyn. and Obstet.*, May 1934, p. 852.

The author sought to determine the cause of the drop in blood-pressure and of the respiratory depression which sometimes occur after endothecal injection. His experiments were conducted on dogs. He was led to the conclusion that respiratory paralysis did not occur when there was no fall of blood-pressure. The respiratory failure is therefore not due to direct paralysis of respiratory centre or of respiratory nerves. Fall in blood-pressure is due to abolition of the function of the sympathetic system brought about by spinal anæsthesia. Recovery of respiration was in all cases preceded by improvement of circulation.

Nitrous oxide oxygen in brain surgery. K. C. MCCARTHY, E. I. MCKESSON, and F. S. CLEMENT. *Anæsth. and Analg.*, May–June 1934, p. 95.

Describing the technique for operation on Gasserian ganglion, the authors show ingenious arrangements for fastening the patient in the sitting position. They also give details of premedication which are on a heroic scale. Two hours before operation the patient is given nembutal (1½ grs.), one hour later this is repeated and morphine (gr. ¼) and hyocine (gr. 1/100) are given hypodermically. An additional ¼ gr. morphine or more "may be given if the first does does not seem to produce a satisfactory narcotic effect." A self-retaining nasal inhaler is used and the mouth sealed with adhesive plaster. The patient is completely draped, and his condition estimated throughout by observation of pulse, respiration and blood-pressure. The incidence of shock was 14 per cent and the mortality 4 per cent in the series of cases reported, and these figures bear favourable comparison with those provided by records of similar work with other anæsthetics.

Sodium pentbarbital and scopolamin analgesia in labour. Anæsth. and Analg., May–June 1934, p. 111.

Patients receive an initial dose of six grains of pentobarbital by the mouth and 1/150 gr. scopolamin hypodermically when the cervix is dilated at least 2 to 3 c.c. Twenty-two patients out of 100 received supplemental doses of various amounts. Ninety-five received "gas" for the perineal stage of delivery. The method is on the authors' own statement one fitted only for institutional employment. The patient needs constant supervision and a bed so constructed that she cannot easily leave it at will. There were a certain proportion of complete failures, a number of patients who were violent and a number seized with uncontrollable desire to defecate leading to difficulty in preserving cleanliness of the perineum. The method does not appear to bear comparison with some others commonly employed in lying-in hospitals, for in addition to the drawbacks mentioned above, the babies' state is below normal.

Obituary.

Lady Berry, M.D.

We regret to record the death of Lady Berry (Frances May Dickinson Berry) which took place on April 15th. Lady Berry, who was the daughter of Mr. Sebastian Dickinson, a barrister with a large practice in India, and sister of Lord Dickinson, was for many years prominent among anæsthetists in London. She took an active part in the affairs of the Section of Anæsthetists of the Royal Society of Medicine, and was a strong advocate of light anæsthesia with open ether for operations on the thyroid gland, in which department of practice she had great experience, working with her husband, Sir James Berry. Lady Berry was the first woman Fellow of the Hunterian Society. She was a woman of exceptional energy, ability, and great charm, and played a leading part in the affairs of the Lyceum Club. She was in former years an ardent mountaineer, being the first woman to reach the summit of a particularly difficult peak in Norway. With her husband she travelled extensively in the Near East, and their knowedge of that part of Europe was put to fine use when together they managed a hospital unit in Servia. Lady Berry published a book on the Slav subjects of the Austrian Empire, and together with her husband and other members of the unit, she wrote the story of their war work in Servia. The Berrys also founded a scholarship to enable women students from Jugoslavia to study medicine in London. Lady Berry was buried close to Little Hampton Common, near her country home.